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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/651,476	08/30/2000	Yang Gao	10932/163	1086

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EXAMINER

NOLAN, DANIEL A

ART UNIT	PAPER NUMBER
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2654

DATE MAILED: 07/12/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/651,476

Applicant(s)

GAO, YANG

Examiner

Daniel A. Nolan

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 07 June 2004.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-8, 10-20 and 22-26 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-3, 6-8, 10-12, 15-20, 22-24 and 26 is/are rejected.
- 7) ☒ Claim(s) 4, 5, 13, 14 and 25 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 30 August 2000 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- ☒ Notice of References Cited (PTO-892)
- ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date 2.
- ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- ☐ Notice of Informal Patent Application (PTO-152)
- ☐ Other: _____.

DETAILED ACTION

1. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

Response to Amendment

2. The filing of 07 June 2004 was applied to the following effect:
 - The title was changed and the objection is withdrawn as satisfied.
 - The specification was changed as indicated and the objections are withdrawn.
 - The proposed replacement drawings are accepted and the objections are withdrawn.
 - The claims were changed as indicated and the objections withdrawn as satisfied.The claims have been examined on the merits.

Response to Arguments

3. Applicant's arguments filed 07 June 2004 have been fully considered but they are not persuasive.

The assertion that Borth et al does not calculate gain (§2 page 21 & §3 page 23) happens not to be the case (column 5 line 67 to column 6 line 1) where the gain values are provided for the new signal in response to noise estimates.

Claim Rejections - 35 USC § 102

Borth et al

1. Claims 1, 3, 6, 7, 17 and 19 are rejected under 35 U.S.C. 102(b) as being anticipated by Borth et al (U.S. Patent 4,628,529 A).
2. Regarding claims 1 and 17, Borth et al, with the invention for a *noise suppression system*, reads on every feature of the claim for *suppressing noise in a signal* as follows:
 - Borth et al reads on the step of *estimating a signal to noise ratio for the signal* (310 in figure 5);
 - Borth et al reads on the step of *classifying the signal to a classification* (570 in figure 5 – see column 10 lines 14-15);
 - Borth et al reads on the step of *calculating a gain for the signal using the signal to noise ratio & classification* ((column 5 line 67 to column 6 line 1 and column 9 lines 4-20 – see column 10 lines 34-35); and
 - Borth et al reads on the step of *modifying the signal using the gain* (250, figures 2-5).
3. Regarding claim 3, the claim is set forth with the same limits as claim 1. Borth et al reads on the feature where the *signal is one channel of a plurality of channels of a speech signal* (210 in figures 2-5).

4. Regarding claim 6, the claim is set forth with the same limits as claim 1.

Borth et al reads on the feature where the *signal is in a time domain, and the method further comprises a step of converting the signal from the time domain to a frequency time prior to the estimating step* (column 4 lines 15-17).

5. Regarding claims 7 and 19; the claims are set forth with the same limits as claims 1 and 17, respectively. Borth et al reads on the feature where the *signal is in a frequency domain, further comprising a step of converting the signal from the frequency domain to a time domain after the modifying step* (column 4 lines 32-36).

Claim Rejections - 35 USC § 103

Borth et al & Chan et al

6. Claims 2 and 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Borth et al in view of Chan et al (U.S. Patent 5,812,970 A).

7. Regarding claims 2 and 18; the claims are set forth with the same limits as claims 1 and 17, respectively. Borth et al operates in high- and low-frequency domains but does not further speak on the subject to the degree that would address *pitch correlation*. Chan et al, with the invention of a *method based on pitch-strength for reducing noise in predetermined sub-bands of a speech signal* reads on the *step of estimating a pitch correlation for the signal* (column 15 lines 21-26), where the

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calculating step further uses the pitch correlation (claims 6 & 7, lines 24-27 & 11-12).

It would have been obvious to a person of ordinary skill in the art of speech signal processing at the time of the invention to apply the method/teachings of Chan et al to the device/method of Borth et al to separate an input signal into selected frequency channels.

Chan et al, Hab-Umbach et al & Borth et al

8. Claims 8-12, 15-16, 20-24 and 26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Chan et al in view of Hab-Umbach et al (U.S. Patent 5,956,678) and further in view of Borth et al.

9. Regarding claims 8 and 20, Chan et al reads on the feature of *suppressing noise in a signal having a 1st portion and a 2nd portion* (from 1 and 22 in figure 1) and on the steps as follows:

- Chan et al reads on the step of *computing a voicing parameter using the 1st portion* (31 in figure 1);
- Chan et al reads on the step of *estimating a signal to noise ratio for the 2nd portion* (22→2→3→4→26 in figure 1);
- Chan et al reads on the step of *calculating a gain for the 2nd portion using the signal to noise ratio and the voicing parameter* (7 in figure 1);

Chan et al does not mention "look-ahead" segments within the same signals. Hab-Umbach et al, with *speech recognition using look-ahead scoring*, teaches the feature

where the 1st signal portion is a look-ahead signal of the 2nd signal portion (column 2 lines 16-23). It would have been obvious to a person of ordinary skill in the art of speech signal processing at the time of the invention to apply the method/teachings of Hab-Umbach et al to the device/method of Chan et al so that scores will be representative of the same associated signal.

Neither Chan et al nor Hab-Umbach et al modify the signal by the gain except in the codec phase. Borth et al reads on the step of *modifying the signal using the gain* (250, figures 2-5 – see column 5 line 67 to column 6 line 1). It would have been obvious to a person of ordinary skill in the art of speech signal processing at the time of the invention to apply the method/teachings of Borth et al to the device/method of Chan et al & Hab-Umbach et al to generate a clean speech signal by spectral gain modification.

10. Regarding claims 9 and 21; the claims are set forth with the same limits as claims 8 and 20, respectively. Chan et al reads on the feature where the 1st portion of the signal is ahead of the 2nd portion in a time domain (depicting 22→2→3 in figure 1).

11. Regarding claims 10 and 22; the claims are set forth with the same limits as claims 8 and 20, respectively. Chan et al teaches the feature where the *voicing parameter is computed by a speech coder (as a neural network of column 3 lines 2-5)*.

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12. Regarding claims 11 and 23; the claims are set forth with the same limits as claims 8 and 20, respectively. Chan et al teaches the feature where the *voicing parameter is a speech classification of the 1st portion (22→2→3→4→31 in figure 1).*

13. Regarding claims 12 and 24; the claims are set forth with the same limits as claims 8 and 20, respectively. Chan et al teaches the feature where the *voicing parameter is a pitch correlation of the 1st portion (36 in figure 1 – see column 15 lines 43-46).*

14. Regarding claim 15, the claim is set forth with the same limits as claim 8. Chan et al teaches the feature where the *signal is in a time domain, and the method further comprises a step of converting the signal from the time domain to a frequency time prior to the estimating step (3→4 in figure 1).*

15. Regarding claims 16 and 26; the claims are set forth with the same limits as claims 8 and 20, respectively. Chan et al teaches the feature where the *signal is in a frequency domain, and the method further comprising a step of converting the signal from the frequency domain to a time domain after the modifying step (11 in figure 1).*

Allowable Subject Matter

16. Claims 4-5, 13-14 and 25 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

17. The following is a statement of reasons for the indication of allowable subject matter:

- The present invention is directed to *suppressing noise by adjusting parameters within established thresholds*.
- Regarding claims 4, 5, 13, 14 and 25, Noso identifies the uniquely distinct feature of "*calculating gain where slope is adjusted according to classification (for the signal)*".
- The closest prior art, Noso et al, discloses adjusting gain using various parameters established for signal classification but fails to anticipate or render the above underlined limitations obvious over the equation established in the claim.

Conclusion

18. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

- Dugan (U.S. Patent 3,814,856 A) control apparatus for sound reinforcement systems.

- Kubanoff (U.S. Patent 4,135,159 A) for suppressing a strong electrical signal.
- Koehnke et al (U.S. Patent 5,940,025 A) Radar noise cancellation method and apparatus.

19. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

20. Any inquiry concerning this communication or earlier communications from the Examiner should be directed to Daniel A. Nolan at telephone (703) 305-1368 whose normal business hours are Mon, Tue, Thu & Fri, from 7 AM to 5 PM.

If attempts to contact the examiner by telephone are unsuccessful, supervisor Richemond Dorvil can be reached at (703)305-9645.

The fax phone number for Technology Center 2600 is (703)872-9314. Label informal and draft communications as "DRAFT" or "PROPOSED", & designate formal

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communications as "EXPEDITED PROCEDURE". Formal response to this action may be faxed according to the above instructions,

or mailed to: Mail Stop AF (or CPA, etc. – see Official Gazette, 04 November 2003)
P.O. Box 1450
Alexandria, VA 22313-1450

or hand-deliver to: Crystal Park 2,
2121 Crystal Drive, Arlington, VA,
Sixth Floor (Receptionist).

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to Technology Center 2600 Customer Service Office at telephone number (703) 306-0377.

Daniel A. Nolan
Examiner
Art Unit 2654

DAN/d
July 1, 2004


RICHEMOND DORVIL
SUPERVISORY PATENT EXAMINER